

EPA		United States Environmental Protection Agency Washington, DC 20460		Work Assignment		Work Assignment Number <div style="text-align: center; font-size: 1.2em;">1-19</div>				
Contract Number <div style="font-size: 1.1em;">EP-C-09-027</div>		Contract Period Base _____ Option Period Number <u>1</u>		Title of Work Assignment/SF Site Name FBC Diesel Emissions Study						
Contractor <div style="font-size: 1.1em;">ARCADIS</div>			Specify Section and Paragraph of Contract SOW							
Purpose: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div> <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Work Plan Approval </div> <div> <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Incremental Funding </div> </div>		Period of Performance From <u>4/29/10</u> To <u>3/31/11</u>								
Comments:										
<input type="checkbox"/> Superfund		Accounting and Appropriations Data				<input type="checkbox"/> Non-Superfund				
SFO (Max 2) 22		Note: To report additional accounting and appropriations data use EPA Form 1900-69A.								
Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										
Authorized Work Assignment Ceiling										
Contract Period:		Cost/Fee:				LOE:				
This Action:										
Total:										
Work Plan / Cost Estimate Approvals										
Contractor WP Dated:		Cost/Fee:				LOE:				
Cumulative Approved:		Cost/Fee:				LOE:				
Work Assignment Manager Name <div style="text-align: center;"> </div>						Branch/Mail Code: <u>APT B</u> Phone Number: <u>919-541-5792</u> FAX Number: _____				
Project Officer Name <div style="text-align: center;"> </div>						Branch/Mail Code: <u>TSB</u> Phone Number: <u>919-541-2708</u> FAX Number: _____				
Other Agency Official Name <div style="text-align: center;"> </div>						Branch/Mail Code: _____ Phone Number: _____ FAX Number: _____				
Contracting Official Name <div style="text-align: center;"> </div>						Branch/Mail Code: <u>CPoD</u> Phone Number: <u>513-487-2094</u> FAX Number: _____				

STATEMENT OF WORK FOR ARCADIS WORK ASSIGNMENT
Fuel borne catalyst diesel emissions study

I) Background

NanoCerium-based diesel fuel additives or fuel borne catalysts (FBC's) are being used increasingly around the world due to their advertised fuel saving benefits and claims of emission reductions. Diesel technologies continue to evolve and the motor vehicle trend is toward diesel-hybrid vehicles with on-board dosing systems to reduce diesel soot and particulate filter traps to collect diesel soot in the exhaust stream. The United States motor vehicle fleet features fewer diesel engines compared to other G20 nations, however, we can expect more diesel vehicles to join the U.S. fleet as global demand for oil resources continues to stretch existing supply.

Currently, a Platinum and Cerium bearing FBC, trade name PlatinumPlus, is approved for on-road use in the U.S. Another nanoCerium FBC manufacturer is seeking regulatory approval for their product in the U.S., trade name Envirox. A third nanoCerium FBC, trade name Eolys, is being used in a wide range of locations in Europe.

The fate and transformation of nanoCerium particles from mobile source emissions is largely unknown. This study aims to understand the combustion processes leading to nanoCerium particle formation and transport, chemically and physically characterize the nanomaterials (pre- and post-combustion), and investigate health effects from inhalation exposure(s) to the post-combustion nanoCerium particles.

The goal of this cross-laboratory collaboration is to gain information about the nature of nanoCerium emissions through measurement, identification, and characterization of the steady-state exhaust signal generated from simple one-cylinder combustion sources in a controlled laboratory setting. The experiments will be split into two discrete stages, this work assignment pertains to Stage one.

Stage one will focus on the combustion, collection, and characterization of diesel emissions from consumer-grade diesel electric generators. The study will focus on an existing experimental generator using the Envirox product and an existing control generator that will never use the FBC. The diesel emissions from both generators will be characterized using standard emissions monitoring methods including: particle mass by TEOM, particle mass by gravimetric determination, and the gas emissions of NO_x, CO, CO₂, SO₂, and THC.

II) Objectives / Scope of Work

The objectives of this work assignment (WA) are to complete the following tasks:

1) The contractor shall assemble an exhaust dilution and sampling system from existing parts for use with consumer-grade diesel generators. This system is intended to be similar to another system located in H106. The dilution systems include a cone diluter

and the associated components manufactured by Southern Research Institute (SRI). The air dilution system shall be coupled with an existing Mi-T-M 6 kw portable electric diesel generator that features a Yanmar L100V engine. EPA shall furnish the diesel generators for this WA. The contractor shall equip the dilution system with a HEPA filter attached to the inlet of the make-up air section of the dilution system.

2) The contractor shall assemble the system in the NRMRL Hi-bay area located next to the heavy-duty chassis dynamometer testing facility. The contractor shall construct a simple baffle to be placed in-between the bottom of the garage door and the ground surface. The diesel generator(s) shall be placed under cover to avoid precipitation coming in contact with the generators. The contractor shall use existing equipment or procure a suitable electric heater to provide engine load for the 6 kw generators.

3) The contractor shall break-in two existing new diesel generators for approximately 250 hours each. The contractor shall procure and outfit the diesel generators with a 5-20 gallon plastic fuel tank system to enable long duration unattended run times. The contractor shall refuel the engines periodically during the break-in period. The contractor shall procure and change the engine oil of the diesel generators after 50 hours of operation and at the end of the 250 hour break-in period. The maintenance documentation for the diesel generators shall be provided by EPA.

III) General Support

The contractor shall provide technical support, operating experience, analytical support, and expendable materials to conduct these tests using existing in-house combustion systems or through the fabrication, rental, purchase, or lending of additional combustion equipment as necessary. This support shall include:

1. The contractor shall provide expendable materials and building supplies to modify, operate, and maintain the necessary combustion equipment, as appropriate.
2. The contractor shall provide engineering and operating labor for the design and execution of test plans on these furnaces and engines.
3. The contractor shall maintain, calibrate, and operate monitoring equipment according to APPCD's Recommend Operating Procedures (ROPs), QAPP requirements, and instrument manuals.
4. The contractor shall collect and retain necessary operational data to ensure compliance with NC Air permit reporting requirements.
5. The contractor shall operate and maintain the experimental systems and air pollution control system in full compliance of NC Air permits.

IV) Quality Assurance Project Plans (QAPPs)

The contractor shall perform the activities described in Objectives 1-3 in accordance with the existing QAPPs entitled:

Diesel Emissions Particulate (DEP) Collection - 04033 9/4/07

Combustion Particle Analysis, Amendment: Aerosol Time of Flight Mass Spectrometry - 07048 revision approved 1/15/09

Generation and Delivery of DEP for Health Effects - 98018 8/7/07

The contractor shall revise or amend these QAPPs as needed in accordance with quality assurance requirements. If revisions are necessary, data acquisition shall not commence until official approval is received from EPA Quality Assurance Staff. The contractor shall comply with all requirements as delineated on the "Quality Assurance Review Form" included with this extramural action.

The EPA work assignment manager will prepare a quality assurance project plan (QAPP) for this project. After preparation, the QAPP shall be reviewed and approved by the ARCADIS work assignment leader and QA officer. Once it has obtained their approval, it shall be submitted to the EPA QA staff for review and approval. It shall be accompanied by a signature page that is signed by the ARCADIS work assignment leader and QA officer to show that they have reviewed and approved the QAPP. It is the responsibility of the ARCADIS work assignment leader to document this process. Upon receipt of the signed QAPP, the EPA work assignment manager and the EPA QA manager will review and approve the QAPP and they will add their signatures to the signature page. Any work involving environmental data shall not commence until the QAPP has received official approval from the EPA QA staff.

V) Documentation of Technical Direction

The COTR, alternate COTR, and contractor's project manager shall schedule weekly project meeting in which task progress, issues, and future technical direction shall be discussed. The contractor's project manager shall summarize the notes from each of these meetings in the form of an email message to the COTR and alternate COTR. This summary shall help assure clear communication, establish project priorities, and provide documentation of technical direction.

VI) Reports of Work

The following reports of work shall be provided.

1. Monthly progress reports with labor costs and ODC charges.

2. Health and safety plans as required by EPA safety officer.
3. The contractor shall comply with all requirements as delineated on the "Quality Assurance Planning Requirements Form" included with this extramural action.
4. Update Facility Manuals as required by EPA QA officer.
5. Operate Compliance reports as required by NC Air permits.